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	Puchalski.	Melissa@epa.gov							
	Alternate	COR:							
	Ralph Baumo	gardner, (202)919-	541-4625,						
	Baumgardne:	r.Ralph@epa.gov							
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	Accounting Info: 17-18-C-58D5-102A45-2505-1758DC7070-001 BFY: 17 EFY: 18 Fund: C Budget Org: 58D5 Program (PRC): 102A45 Budget (BOC): 2505 DCN - Line ID:				
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ATTACHMENT A

STATEMENT OF WORK

Title: Supplemental Monitoring Studies at CASTNET Sites in Support of the NOx/SOx Secondary Standard

Contractor: Amec Foster Wheeler

Contract #: EP-W-16-015 Task Order #: 1010

Period of Performance: 7/9/2017 to 7/8/2018

EPA Key Personnel

Task Order Project Officer (TOPO)/Contract Level Project Officer (PO):

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Clean Air Markets Division (OAP/OAR/CAMD)

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Contracting Officer (CO):

Michael Fox

Contracting Officer

Administrative Contract Service Center

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Washington DC 20460

phone: (202) 564-2550

email: fox.michael@epa.gov

STATEMENT OF WORK

I. INTRODUCTION

The Clean Air Status and Trends Network (CASTNET) is a long-term environmental monitoring network that measures changes in ambient air quality and assesses atmospheric deposition over broad geographic regions of the U.S. (https://www.epa.gov/castnet). Operating since 1987, CASTNET has evolved into a robust regional monitoring program which currently consists of approximately 95 monitoring stations nationwide. The Environmental Protection Agency (EPA) coordinates the operation of the network in cooperation with numerous federal, tribal, state and local partners.

The primary monitoring objectives of CASTNET are to:

- Provide high quality data on atmospheric deposition, rural ground level ozone and other forms of atmospheric pollution;
- Support the primary and secondary ozone NAAQS and provide data on NAAQS compliance in rural
 areas;
- Monitor the status and trends in regional air quality and atmospheric deposition;
- Assess and report on geographic patterns and long-term, temporal trends in ambient air pollution and atmospheric deposition;
- Improve our understanding of PM and ozone formation;
- Validate and improve atmospheric models;
- Provide data for health-based research and epidemiology studies;
- Assess the effectiveness of EPA's emission reduction programs; and
- Support science and ecosystem studies.

CASTNET sites measure weekly average concentrations of sulfate (SO₄²⁻), nitrate (NO₃⁻), ammonium (NH₄⁺), sulfur dioxide (SO₂), nitric acid (HNO₃), chloride (Cl⁻) and the base cations (Na⁺, K⁺, Mg²⁺and Ca²⁺) using a 3-stage filter pack. In addition, each site may make ancillary measurements, including hourly ozone (O₃), hourly meteorology, ammonia (NH₃) gas using passive devices, and trace-level gases. Trace-level gas monitors include reactive oxidized nitrogen (NOy), nitric oxide (NO), sulfur dioxide (SO₂) and carbon monoxide (CO). CASTNET O₃, meteorological, and trace gas measurements follow the requirements in the Code of Federal Regulations (CFR) and EPA's Quality Assurance Handbook.

II. PURPOSE

The primary purpose of this task order is to improve the science and understanding of deposition process within the atmosphere. The EPA is currently evaluating the secondary National Ambient Air Quality Standard (NAAQS) for NOx and SOx. The work under this task will enhance the existing research currently available on direct deposition methods, atmospheric chemical processes that drive deposition parameters and estimates of sulfur and nitrogen loading to various landscapes. This research is a collaborative effort between EPA's Office of Air and Radiation (OAR), the Office of Research and Development (ORD), and other federal partners. This is a follow-on task order from the base period.

Under this task order the contractor will continue to operate the enhanced NOy analyzer at the Duke Forest flux tower site located in North Carolina. The enhanced NOy analyzer will operate at the Duke Forest tower site through June 2018.

Also under this task order, the contactor continue collecting the site characterization dataset for 3 co-located CASTNET/AMoN sites. The dataset shall contain information about the soil and vegetation characteristics within 1km of each AMoN site. The contractor shall collect soil and vegetation samples at approximately 15 locations at each site for laboratory analysis. A bi-direction flux box model will be run using the site characterization information as input to calculate NH₃ fluxes at each site. The three sites where measurements shall be made are Bondville, IL (BVL130), Duke Forest, NC (DUK008), and Chiricahua National Monument, AZ (CHA467).

III. CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this task order are consistent with the activities authorized in CLIN 22 of the contract's Statement of Work.

IV. TECHNICAL DIRECTION

1. Prepare a Technical Proposal & Cost Estimate

The Contractor shall prepare a Task Order Proposal in accordance with the terms and conditions of contract clauses B.2 entitled Fixed Rates for Services – Indefinite delivery/Indefinite quantity contract.

2. Operate, Calibrate, and Quality Assure the Enhanced-NOy Measurement System

The Contractor shall continue operating the enhanced-NOy measurement system at the Duke Forest Flux Tower site (DUK008) which is co-located with a CASTNET filter pack. Operation includes routine calibrations, remote troubleshooting, QA, and data reporting. The operation of the standard NOy system and the CASTNET filter pack is covered under Task Order 103 Base Program Operations. Hourly measurements from the enhanced NOy system include NHx, TNx, true NO₂, NOy, NO, and HNO₃. At the Duke Forest site, the enhanced NOy inlet is placed above the forest canopy on the 150ft tower.

Data from the enhanced NOy measurement system shall be delivered to CAMD daily with the routine CASTNET submittals. Quality assured data shall be submitted to CAMD monthly, 90 days after data collection.

Under this task the contractor shall also continue testing the converters for a configuration that provides the most reliable, accurate data as compared to the CASTNET filterpack, AMoN and MARGA system at Duke Forest. Further testing on the calibration system is also expected.

This task includes 4 repair trips for the enhanced NOy measurement system that shall only be used as necessary.

3. Ammonia Flux Site Characterization Database

The contractor installed measurement systems to collect soil moisture and temperature, 3D wind direction, and CASTNET meteorology at three CASTNET sites to develop a database of site characteristics for modeling the bi-directional flux of NH₃ under Task Order 0010. The contractor also visited each site to collect soil and vegetation samples for analysis. This task is a continuation of this work. The contractor shall visit each of the 3 sites an additional 3 times (seasonally) to collect and analyze soil and vegetation samples. Additionally, the contractor shall continue to collect hourly meteorological measurements and poll the data remotely. Meteorological measurements will be covered under Task Order 103 Base Program.

Soil moisture and temperature sensors and sonic anemometers were installed under Task Order 0010. Sonic anemometer measurements of 3-dimensional wind (vectors u, v, w) and temperature shall be recorded at 10

Hertz. The contractor shall develop a post-processing package to perform data filtering, coordinate rotations, calculations of 30 minute or hourly turbulence statistics and apply QA metrics from the sonic anemometer. The contractor may use a software package, such as Eddy Pro, to post-process the data.

Hourly data shall be stored in Oracle and submitted to CAMD daily. Quality assured results shall be submitted 90 days after measurements are recorded or analyzed.

This task also includes removing the soil moisture meter, meteorological equipment and data loggers once the study is over. The contractor may request that the site operators or calibrators remove the equipment if appropriate.

EPA has provided the contractor with sampling locations within a 1-km radius of each site. The locations were selected based on soil and vegetation type as reported in national online databases. The contractor shall use the sample locations as a guide when collecting the soil and vegetation samples, keeping in mind that the goal is to collect the dominate species and/or soil type.

Sample measurements and schedules are included in Table 1. The measurements are labeled to indicate if the contractor shall be responsible for the cost of the measurement. A brief description of the measurements that the contractor will be collecting is found below.

Approximately 30 composite soil samples will be collected from 15 locations and analyzed seasonally (3 times under this task order) for each of the three pilot sites (BVL130, DUK008, and CHA467). At each of the 15 locations, 5 soil cores will be collected with a 1-m by 1-m plot. The sample depth will capture the organic (O) and topsoil (A) horizons. Individual cores shall be separated into the two horizons and the five replicate samples shall be composited by horizon and measurement location generation a total of 15 O-horizon and 15 A-horizon samples per pilot site per season. Soil shall be immediately stored under refrigeration and extracted within 72 hours. Samples shall be analyzed for extractable NH₄⁺ and pH. For the NH₄⁺ analysis, five grams of field moist soil shall be extracted in 20 g of 0.01 molar CaCl₂ following standard protocols. Samples shall be analyzed by ion chromatography (IC) or colorimetry by the chosen laboratory. Direct determination of pH shall be performed on a 1:5 fresh soil/water slurry. Soil gravimetric moisture shall be determined by weight loss after heating 25 g of soil for 24 hours at 105 degrees Celsius (C).

Leaf litter shall be collected on the soil surface in the sample 15 locations as the soil samples were taken. Leaf litter, where available, shall be collected seasonally. Approximately 50 g of leaf litter shall be collected within the 1x1m soil sampling location.

Green leaves shall be sampled seasonally (3 additional times under this task order) from three to five individual trees/shrubs representing the dominate species. EPA will provide maps with the most probable dominate species at each sampling location. Tree/shrub locations shall coincide with the soil/litter sampling locations where possible. For each sample, approximately 25 g of leaves shall be sampled from the upper and lower canopy using the slingshot method. Litter and leaf samples shall immediately be stored under refrigeration. Bulk green leaf and litter samples shall be subsampled for analysis of moisture, total nitrogen (N), and NH₄⁺. For the NH₄⁺ analysis, fresh material shall be ground in liquid nitrogen and 5 g of material shall be extracted in 20 mL of deionized water. Extractions shall take place within 72 hours of collections. Extracts shall be analyzed for NH₄⁺ by IC or colorimetry. For total N analyses, material shall be dried, ground and analyzed for total N via combustion/elemental analysis. Moisture content shall be determined by weight loss after drying at 60 degrees C to a constant weight. For costing, the contractor shall assume that the upper and lower canopy and individual tree samples shall be bulked for analysis such that each visit will result in 15 samples.

Leaf area index (LAI) shall be measured at seasonally at approximately 15 locations in the summer and winter to capture minimum and maximum LAI. The contractor shall use the LAI 2000 plant canopy analyzer that was procured by EPA/ORD. LAI sampling locations shall correspond with soil and vegetation sampling locations where possible.

Green: EPA will provide; Blue: Amec will provide

Measuremen t Frequency	Measurement	Time period	Notes	BVL130	DUK008	CHA467
	Canopy Height ¹	Dominate species at start and end of study	LIDAR	LIDAR data exists ¹ , but we need to take measurement s of crop canopy height ²	Existing ¹	Needed ¹
	Vegetation characterizatio n – species type, percentage of each species ¹	LANDFIRE plots at start of study	LANDFIRE	Exisiting ¹ , but we need to know what crops are planted ^{1,2}	Existing ¹	Existing ¹
	Vegetation species density – stems per m ² or ha ²	Peak leaf out	LIDAR measurements	Needed ²	Needed ²	Needed ²
	Surface albedo ¹	Initial	Remote sensing data	Existing ¹	Existing ¹	Existing ¹
Initial Measurement	Hydrological group ¹	Hydrological Initial Ni		Existing ¹	Existing ¹	Existing ¹
(or 1-time	Quality Rating ¹	Initial	NRCS WSS	Existing ¹	Existing ¹	Existing ¹
measurement)	Soil Type – type, percentage of each species ¹	Initial	NRCS WSS	Existing ¹	Existing ¹	Existing ¹
	Soil Characteristics – bulk density, sand/silt/clay, wilt point, field capacity, depth to impervious layer, rooting depth¹	Initial	NRCS WSS	Existing ¹	Existing ¹	Existing ¹
	Age of Plot ¹	Initial	Ag – how many years has plot been cultivated, forest – when was stand last cleared?	Existing ¹	Existing ¹	?

	Overall slope of site ¹		NRCS WSS	Existing ¹	Existing ¹	Existing ¹
	LAI Profiles ²	Coincide with soil/litter sampling. Measurement s at leaf out, peak LAI, senescence, and minimum LAI	Li-COR LAI 2200C	Take measurement at 15 locations ²	Take measurement s at 15 locations ²	Take measurement s at 15 locations ²
	Bulk leaf tissue pH, total [N] and [NH ₄ +] ²	Seasonally	Dominate species, 4 trees at each location	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²
Seasonal	Litter – depth, composition, pH, total [N] and [NH ₄ ⁺] ²	After leaf drop	Dominate species at soil measurement sites. Same analysis as bulk leaf tissue.	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²
	Soil chemistry (pH, [NH ₄ +], and [NO ₃ -]) ²	Seasonally, coincide with vegetation samples	Top two horizons — typically the O (organic) and A (topsoil) horizons for dominate soils/vegetatio n locations.	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²	Take measurement s at 15 sites ²
Hourly	Soil characteristics (moisture, temperature) ²	Hourly measurement s at 1 location	Locations depend on soil types, vegetation and site slope Temperature probe Campbell Scientific 107 Soil moisture Campbell scientific Soil H ₂ O content reflectometer CS650	Take measurement at AMoN site ²	Take measurement at AMoN site ²	Take measurement at AMoN site ²
	Meteorology ²	Hourly, 10 Hz temperature and 3d wind vectors	Standard suite of CASTNET measurements.	Take measurement at AMoN site ²	Take measurement at AMoN site ²	Take measurement at AMoN site ²

¹EPA will provide measurement or data, ² Amec Foster Wheeler shall provide collected data

The contractor shall include a technical proposal and cost estimate for the measurements listed above.

4. Whiteface Summit Filter Pack

The contractor installed a filter pack system (including a data logger, pump, flow system) on the roof of the Whiteface research lab at the summit in May 2017 under Task Order 0010. The filter pack flow system automatically switches off when moisture is high (clouds). The site shall be decommissioned in the fall when access to the site is no longer feasible. Under this task for decommissioning the site one trip is included. The filter pack analysis, QA, and calibrations will be included under Task Order 103 Base Operations.

5. Installation of Trace SO₂ Analyzer

The contractor shall install the trace SO₂ analyzer that was removed the CASTNET Beltsville, MD (BEL116) site at a trace NOy CASTNET site. Operation, quality assurance and data delivery will be covered under Task Order 103, Base Program Operations. During the installation trip, the contractor shall train the site operator, provide SOPs and calibrate the analyzer.

V. DELIVERABLES AND SCHEDULE

1. Proposal

The contractor shall deliver a Task Order Technical Proposal & Cost Estimate in accordance with clause B.7 Task Order Ordering Procedures of the contract. The proposal shall be submitted 10 days after receipt of the SOW.

2. Monthly Progress Report

The contractor shall prepare and submit a monthly progress report by the 15th of each month summarizing the progress made, issues encountered or expected, work planned for the next reporting period and costs. These reports shall comply with contract clauses F.1, Monthly Progress Report, and F-5, Reports of Work. Reports shall be delivered electronically.

3. Database

The contractor shall deliver a database with valid data and all QA/QC data reported during the field campaign. The database shall be delivered 90 days after the final measurement is taken.

4. Study Plan & SOPs for Site Characterization Study

A final study plan shall be delivered by July 30th and shall include the final SOPs for the field and laboratory procedures.

5. Publication

Within 6-months after the final sample is collected, the contractor shall work with the TOPOs and technical advisors to prepare an EPA summary report.

Distribution of Deliverables:

Addressee	Copies
EPA Contracting Officer (Mike Fox)	1
EPA Project Officer (Melissa Puchalski)	1
EPA Alternate (Ralph Baumgardner)	1
EPA Technical Advisor (John T Walker)	1

ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts							
Period	Previous Amount	This Action	Amount				
Base Period	1	\$100,000.00	\$100,000.00				
Total	:=	\$100,000.00	\$100,000.00				

	Total Task Order Ceiling							
Period	Previous Amount	This Action	Amount					
Base Period	-	\$169,754.00	\$169,754.00					
Total	-	\$169,754.00	\$169,754.00					

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDMENT OF SOLICITATION/MODIFIC	ATION OF CONTR	RACT	1. CONTRACT ID CODE	PAGE	OF PAGES
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HPOD US Environmental Protection William Jefferson Clinton Bu 1200 Pennsylvania Avenue, N. Mail Code: 3803R Washington DC 20460	uilding				
8. NAME AND ADDRESS OF CONTRACTOR (No., street	t county State and ZIP Co	ide)	9A. AMENDMENT OF SOLICITATION NO.		
AMEC ENVIRONMENT & INFRASTRUMENT: LISA DWYER AMEC FOSTER WHEELER ENVIRONMENT 751 ARBOR WAY, STE 180 (b)(4) BLUE BELL PA 194221960	CTURE, INC.	(<u>x</u>	9B. DATED (SEE ITEM 11) 10A. MODIFICATION OF CONTRACT/ORDEI EP-W-16-015 1010 10B. DATED (SEE ITEM 13)	R NO.	
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14. DESCRIPTION OF AMENDMENT/MODIFICATION DUNS Number: 038086125 The purpose of this administ Macy and change Ralph Baumga	(Organized by UCF see	ction headings, includ	ling solicitation/contract subject matter where features t to change the alternate	asible.) e COR to T	=
Alternate COR: Taylor Macy, (202)343-9183,	Macy.Taylor	@epa.gov			
Technical POC: Ralph Baumgardner, (919)541- TOCOR: Melissa Puchalski LIST OF CHANGES: Continued Except as provided herein, all terms and conditions of the				in full force and effe	ect.
15A. NAME AND TITLE OF SIGNER (Type or print)			16A. NAME AND TITLE OF CONTRACTING OF Michael C. Fox		
15B. CONTRACTOR/OFFEROR	15C.		16B. UNITED STATES OF AMERICA	ELECTRONIC ELECTRONIC	12/19/2017
(Cignoture of person authorized to sign)			(Signature of Contracting Officer)		

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(11)	Reason for Modification : Other Administrative	(-,	(2)	(=)	(-7
	Action				
	Total Amount for this Modification: \$0.00				
	New Total Amount for this Version: \$0.00				
	New Total Amount for this Award: \$169,754.00				
	Alternate COR/Project Officer changed to :				
	Taylor Macy				
	Payment:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
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6. ISSUED BY CODE	HPOD	7. ADI	MINISTERED BY (If other than Item 6)	CODE	
HPOD US Environmental Protection William Jefferson Clinton Bu 1200 Pennsylvania Avenue, N. Mail Code: 3803R	ilding				
Washington DC 20460 8. NAME AND ADDRESS OF CONTRACTOR (No., street	county State and 7IP Code)	l laa	AMENDMENT OF SOLICITATION NO.		
**RAME AND ADDRESS OF CONTRACTOR (No., street) AMEC ENVIRONMENT & INFRASTRUCT Attn: LISA DWYER AMEC FOSTER WHEELER ENVIRONMI 751 ARBOR WAY, STE 180 ((b)(4) BLUE BELL PA 194221960	CTURE, INC.	98. × 10/ × E.F.	A. MODIFICATION OF CONTRACT/ORDER PW-16-015	NO.	
CODE 038086125	FACILITY CODE	o	6/27/2017		
07 15 15 15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11. THIS ITEM ONLY AP		IENTS OF SOLICITATIONS		
separate letter or telegram which includes a reference THE PLACE DESIGNATED FOR THE RECEIPT OF C virtue of this amendment you desire to change an offer reference to the solicitation and this amendment, and 12. ACCOUNTING AND APPROPRIATION DATA (If requires See Schedule	to the solicitation and ameno PFERS PRIOR TO THE HC r already submitted , such ch is received prior to the openii prired)	dment numbers. FA DUR AND DATE SPE hange may be made ng hour and date spe Net Inc	CIFIED MAY RESULT IN REJECTION OF You by telegram or letter, provided each telegram ecified.	O BE RECEIVED OUR OFFER If or letter makes 669,754.0	DAT by
			SES SET FORTH IN ITEM 14 ARE MADE IN		
	T/ORDER IS MODIFIED TO IN ITEM 14, PURSUANT TO	REFLECT THE ADI O THE AUTHORITY	MINISTRATIVE CHANGES (such as changes OF FAR 43.103(b).		
D. OTHER (Specify type of modification	and authority)				
X FAR 52.232-22 Limita	tion of Funds				
E. IMPORTANT: Contractor 🗵 is not.	\square is required to sign this de	ocument and return	copies to the issui	ng office.	
14. DESCRIPTION OF AMENDMENT/MODIFICATION (DUNS Number: 038086125 The purpose of this modification this task order.					9,754.00
This is a Time-and-Materials Contractor is not authorized					54.00 the
The total obligated/funded company of Amount page). Except as provided herein, all terms and conditions of the state of t	to \$169,754.00 nts and Ceiline	0. This oregs and Atta	der is now fully-funded achment B is hereby ind	d as det. corporate	ailed in ed (1
15A. NAME AND TITLE OF SIGNER (Type or print)		16A.	NAME AND TITLE OF CONTRACTING OFF		
15B. CONTRACTOR/OFFEROR	15C. DATE		UNITED STATES OF AMERICA	EL FETRONIC S:GNATURE	16C. DATE SIGNED 03/29/2018
(Signature of person authorized to sign)			(Signature of Contracting Officer)		

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NAME OF OFFEROR OR CONTRACTOR

(- .	SUPPLIES/SERVICES	QUANTITY	0 16	UNIT PRICE	AMOUNT
(A)	(B)	(C)	(D)	(E)	(F)
	TOCOR: Melissa Puchalski				
	LIST OF CHANGES:				
	Reason for Modification : Funding Only Action				
	Total Amount for this Modification: \$0.00				
	New Total Amount for this Version: \$169,754.00				
	New Total Amount for this Award: \$169,754.00				
	Obligated Amount for this Modification: \$69,754.00				
	New Total Obligated Amount for this Award:				
	\$169,754.00				
	Incremental Funded Amount changed: from				
	\$100,000.00 to \$169,754.00				
	CHANGES FOR LINE ITEM NUMBER: 1				
	Obligated Amount for this modification: \$69,754.00				
	Incremental Funded Amount changed from				
	\$100,000.00 to \$169,754.00				
	NEW ACCOUNTING CODE ADDED:				
	Account code:				
	18-19-C-58D5-000A45-2505-1858DC8044-001				
	Beginning FiscalYear 18				
	Ending Fiscal Year 19				
	Fund (Appropriation) C				
	Budget Organization 58D5				
	Program (PRC) 000A45				
	Budget (BOC) 2505				
	Job # (Site/Project)				
	Cost Organization				
	DCN-LineID 1858DC8044-001				
	Amount: \$69,754.00				
	Subject To Funding: N				
	Payment Address:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
	Payment:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
	FOB: Destination				
	Period of Performance: 07/09/2017 to 07/08/2018				
	Tellou of reflormance: 0//05/201/ to 0//06/2018				
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ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts								
Period	Previous Amount	This Action	Amount					
Base Period	\$100,000.00	\$69,754.00	\$169,754.00					
Total	\$100,000.00	\$69,754.00	\$169,754.00					

Total Task Order Ceiling							
Period	Previous Amount	This Action	Amount				
Base Period		Í	\$169,754.00				
Total	-	-	\$169,754.00				

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDME	NT OF SOLICITATION/MODIFIC	ATION OF C	ONTRACT		CONTRACT ID CODE	PAGE	OF PAGES
2. AMENDME	NT/MODIFICATION NO.	3. EFFECTIVE	DATE	4. REC	L QUISITION/PURCHASE REQ. NO.	5. PROJECT	NO. (If applicable)
P00003		See Blo	ck 16C				
6. ISSUED BY	CODE	HPOD		7. AD	MINISTERED BY (If other than Item 6)	CODE	
William 1200 Pe Mail Co	ronmental Protection Jefferson Clinton B nnsylvania Avenue, N de: 3803R ton DC 20460	uilding					
	ADDRESS OF CONTRACTOR (No., stree	nt county State and	ZIP Code)	. 94	. AMENDMENT OF SOLICITATION NO.		į
WOOD ENV SOLUTION 751 Arbo	VIRONMENT & INFRASTRU US, INC. Attn: JOSEPH	CTURE	_	9B	A. MODIFICATION OF CONTRACT/ORDER NOTE:	O.	
CODE 03	2005105	FACILITY COL)E				
03	8086125 				6/27/2017		
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Offers must Items 8 and separate let RECEIVED OFFER. If I each letter of 12. ACCOUNT	15, and returning content or electronic communication which incommunication which incommunication which incomposed in the PLACE DESIGNATED FOR THIs by virtue of this amendment you desire to be electronic communication makes refere TING AND APPROPRIATION DATA (If recommunication data)	prior to the hour a opies of the amen cludes a reference E RECEIPT OF C change an offer ence to the solicite	and date specified in the so idment; (b) By acknowledge e to the solicitation and am FFERS PRIOR TO THE H already submitted, such cl ation and this amendment,	olicitat jing re endm lOUR hange and is	ion or as amended, by one of the following met ceipt of this amendment on each copy of the off ent numbers. FAILURE OF YOUR ACKNOWL AND DATE SPECIFIED MAY RESULT IN REJE may be made by letter or electronic communics s received prior to the opening hour and date sp	thods: (a) By offer submitted; EDGEMENT 1 ECTION OF YOutline	or (c) By TO BE DUR
See Sch	brands of the Wasterstand II.					<i>N</i>	
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	D. OTHER (Specify type of modification	a and authority)					
v	FAR 52.232-22 Limit	*.*	Funde				
^	Section 1	9C30		100 4 00 000 000			
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1-1		ation is	de-obligate f	und	ing in the amount of \$53	2,271.7	7 from
	sk order.						
	Melissa Puchalski						
	CHANGES:						
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	ntal Funded Amount ch	ianged:	from				
\$169,754	1.00 to \$117,482.23						
Continue		he document refe	erenced in Item 9 A or 10A,	, as he	retofore changed, remains unchanged and in fi	ull force and e	ffect .
15A. NAME AI	ND TITLE OF SIGNER (Type or print)				NAME AND TITLE OF CONTRACTING OFFICE	CER (Type or p	rint)
					chael C. Fox		
15B. CONTRA	CTOR/OFFEROR		15C. DATE SIGNED			L FETRONIC S:GNATURE	16C. DATE SIGNED 03/21/2019
29	(Signature of person authorized to sign)				(Signature of Contracting Officer)		-0, -1, 2017

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 OF

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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY UNIT	UNIT PRICE	AMOUNT
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	Obligated Amount for this Modification:			
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	Incremental Funded Amount changed from			
	\$169,754.00 to \$117,482.23			
	FOB changed from Destination to			
	CHANGES FOR ACCOUNTING CODE:			
	18-19-C-58D5-000A45-2505-1858DC8044-001			
	Amount changed from \$69,754.00 to \$17,482.23			
	Payment:			
	RTP Finance Center			
	US Environmental Protection Agency			
	RTP-Finance Center (AA216-01)			
	109 TW Alexander Drive			
	www2.epa.gov/financial/contracts			
	Durham NC 27711			
	Period of Performance: 07/09/2017 to 07/08/2018			
NON 75 40 04 45	l			ODTIONAL FORMAGO (4 00)

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.P-W-16	5-015		EFFECTIVE DATE	1011						ISSUE DATE
	OR SOLICITATION ORMATION CALL:	m. Mads Michael	Fox			TELEPHONS 202-564		•	9. OFFER 6 E.T.	DUE DATE/LOCAL TIME
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	ronmental Pro			•) SMALL BUS	SWALL	C) (Was	IEN-OWNED SMALL I 88) CLIGIBLE UNDER 1. BUSINESS PRICCE	THE WOMEN-OWN	ED NAICS 541620
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19. ITEM NO.		20. SCHEDULE OF SUPPLIES	S/SERVICES	5		21. QUANTITY	22. UNIT	23. UNIT PI	RICE	24. AMOUNT
	\$6,400.00.									
			(m - 22)							
	This is a Time-and-Materials (T&M) task order with a total ceiling price of \$6,400.00, which									
		at celling price of ctor is not author								
		exceeds at its ow			. He					
	Conclactor	caccods at 1t3 ow	11 1131	κ.						
	The total of	obligated/funded c	eiling	g amount for						
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	is hereby	incorporated (1 pa	ge).							
	Contracting	g Officer's Repres	entat:	ive (COR) fo	r					
	this task									
	Melissa Puo	chalski, (202) 343	-9882,	,						
	Puchalski.	Melissa@epa.gov								
	Alternate (2002							
	1	elista, (919) 541-	2003,							
	Evangelista	a.Mark@epa.gov								
	The service	es of this order a	re fo	r severable.						
	TOCOR: MRUI	RY02								
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NAME OF OFFEROR OR CONTRACTOR

EM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	17-18-B-53G3-102A58-2505-1753GP7032-001 BFY: 17				
	EFY: 18 Fund: B Budget Org: 53G3 Program (PRC):				
	102A58 Budget (BOC): 2505 DCN - Line ID:				
	1753GP7032-001 Funding Flag: Partial				
	Funded: \$3,000.00				
		1	1		

ATTACHMENT A STATEMENT OF WORK

Title: Prepare US/Canada Progress Report

Contractor: Amec Foster Wheeler

Contract #: EP-W-16-015

Task Order #: 1011

Period of Performance: 07/17/2017 to 7/08/2018

EPA Key Personnel

Task Order Project Officer (TOPO)/Contract Level Project Officer (PO):

Melissa Puchalski

Clean Air Markets Division (OAP/OAR/CAMD)

1200 Pennsylvania Ave., NW

Mail Code 6204M

Washington, DC 20460

phone: (202) 343-9882

email: puchalski.melissa@epa.gov

Alternate TOPO:

Mark Evangelista

Air Quality Assessment Division (OAR/OAQPS/AQAD)

Mail Drop C304-04

Research Triangle Park, NC 27711

Phone: (919) 541-2803

Email: evangelista.mark@epa.gov

Contracting Officer (CO):

Mike Fox

Contracting Officer

Administrative Contract Service Center

1200 Pennsylvania Ave N.W.

Mail Code 3803R

Washington DC 20460

phone: (202) 564-2550

email: fox.michael@epa.gov

STATEMENT OF WORK

I. INTRODUCTION

The Clean Air Status and Trends Network (CASTNET) is a long-term environmental monitoring network that measures changes in ambient air quality and assesses atmospheric deposition over broad geographic regions of the U.S. (https://www.epa.gov/castnet). Operating since 1987, CASTNET has evolved into a robust regional monitoring program which currently consists of approximately 95 monitoring stations nationwide. The Environmental Protection Agency (EPA) coordinates the operation of the network in cooperation with numerous federal, tribal, state and local partners.

The primary monitoring objectives of CASTNET are to:

- Provide high quality data on atmospheric deposition, rural ground level ozone and other forms of atmospheric pollution;
- Support the primary and secondary ozone NAAQS and provide data on NAAQS compliance in rural areas;
- Monitor the status and trends in regional air quality and atmospheric deposition;
- Assess and report on geographic patterns and long-term, temporal trends in ambient air pollution and atmospheric deposition;
- Improve our understanding of PM and ozone formation;
- Validate and improve atmospheric models;
- Provide data for health-based research and epidemiology studies;
- Assess the effectiveness of EPA's emission reduction programs; and
- Support science and ecosystem studies.

CASTNET sites measure weekly average concentrations of sulfate (SO₄²⁻), nitrate (NO₃⁻), ammonium (NH₄⁺), sulfur dioxide (SO₂), nitric acid (HNO₃), chloride (Cl⁻) and the base cations (Na⁺, K⁺, Mg²⁺and Ca²⁺) using a 3-stage filter pack. In addition, each site may make ancillary measurements, including hourly ozone (O₃), hourly meteorology, ammonia (NH₃) gas using passive devices, and trace-level gases. Trace-level gas monitors include reactive oxidized nitrogen (NOy), nitric oxide (NO), sulfur dioxide (SO₂) and carbon monoxide (CO). CASTNET O₃, meteorological, and trace gas measurements follow the requirements in the Code of Federal Regulations (CFR) and EPA's Quality Assurance Handbook.

II. PURPOSE

The primary purpose of this task order is to prepare the 2016 Canada-United States Air Quality Agreement Progress Report. The Task Order Project Officer shall provide technical direction for performance of specific tasks under this task order.

III. CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this task order are consistent with the activities authorized in CLIN 22 of the contract's Statement of Work.

IV. TECHNICAL DIRECTION

1. Prepare a Technical Proposal & Cost Estimate

The Contractor shall prepare a Task Order Proposal in accordance with the terms and conditions of contract clauses B.2 entitled Fixed Rates for Services – Indefinite delivery/Indefinite quantity contract.

2. Prepare the 2016 Canada-United States Air Quality Agreement Progress Report.

The Contractor shall prepare the 2016 Report utilizing the data and text provided by EPA, and using the inside grid and cover design approved by EPA. The content of the 2016 report will be provided to the Contractor by EPA as a Word document including source data for graphs in Excel format) and tables, and accompanying text. The Contractor shall create the final graphics (charts and tables) for the 2016 Report from the data provided by EPA. The graphics created by the Contractor shall include the same data format and depiction as the graphics provided by EPA. The Contractor may use the EPA-provided graphics as a guide. Previous version of the Report (2014) will be provided as an example.

The Contractor shall research and identify photos (10-15) to include in the 2016 report for review by EPA. If necessary, revise photos selected and purchase photo rights, if required.

EPA has estimated 20 labor hours for contract alterations after the author reviews the draft and proofing to prepare the final Report. This cost shall only be charged if needed.

3. Travel to Meetings

None anticipated.

V. DELIVERABLES AND SCHEDULE

1. Proposal

The contractor shall deliver a Task Order Proposal in accordance with clause B.7 Task Order Ordering Procedures of the contract. The proposal shall be submitted 10 days after receipt of the SOW.

2. Monthly Progress Report

The contractor shall prepare and submit a monthly progress report by the 15th of each month summarizing the progress made, issues encountered or expected, work planned for the next reporting period and costs. These reports shall comply with contract clauses F.3 Reports of Work and F.5 Monthly Progress Report. Reports shall be delivered electronically.

3. Report

The 2014 Report will be provided as an example to the Contractor by EPA. The 2016 Report will be a shorter and more condensed version of the 2014 Report; page total of the 2016 Report will be determined upon approval of the concept, cover, and inside grid. The format of the Report shall be PDF. The Contractor will create a final high resolution PDF and transfer it to DVD. No hardcopies of the Report will be required. All (layered) source Adobe Photoshop CS4 files shall be provided to EPA. All fonts shall be provided to EPA.

Distribution of Deliverables:

Addressee	Copies
EPA Contracting Officer (Mike Fox)	1
EPA Project Officer (Melissa Puchalski)	1
EPA Alternate (Mark Evangelista)	1

ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts							
Period	Previous Amount	This Action	Amount				
Base Period	¥	\$3,000.00	\$3,000.00				
Total	-	\$3,000.00	\$3,000.00				

	Total Task Order Ceiling								
Period	Previous Amount	This Action	Amount						
Base Period	-	\$6,400.00	\$6,400.00						
Total	-	\$6,400.00	\$6,400.00						

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDME	NT OF SOLICITATION/MODIFICA	ATION OF CO	NTRACT		1. CONTRACT ID CODE	PAGE	OF PAGES
2. AMENDME	NT/MODIFICATION NO.	3. EFFECTIVE (DATE 4	1. REC	UISITION/PURCHASE REQ. NO.	5. PROJECT	NO. (If applicable)
001		See Bloc	k 16C	R-C	AR-17-01514		
6. ISSUED BY	CODE	HPOD		7. ADI	MINISTERED BY (If other than Item 6)	CODE	
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	ton DC 20460			Less			
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CODE 03	88086125	FACILITY CODE	=	0	7/14/2017		
	5 Mg - 60 - 21 - 40 (000Mp000)	11, THIS ITE	 M ONLY APPLIES TO AM		IENTS OF SOLICITATIONS		
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v	D. OTHER (Specify type of modification FAR 52.232-22 Limita	*4	Eundo				
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15B. CONTRA	ACTOR/OFFEROR	j	15C. DATE SIGNED	16B.	UNITED STATES OF AMERICA	FETRONIC S:GNATURE	16C. DATE SIGNED 08/23/2017
£	(Signature of person authorized to sign)				(Signature of Contracting Officer)		00,23,2011

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 OF

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NAME OF OFFEROR OR CONTRACTOR

ΓΕΜ NO.	SUPPLIES/SERVICES	QUANTITY		UNIT PRICE	AMOUNT
(A)	(B)	(C)	(D)	(E)	(F)
	\$3,000.00 to \$6,400.00				
	CHANGES FOR LINE ITEM NUMBER: 1				
	Obligated Amount for this modification: \$3,400.00				
	Incremental Funded Amount changed from \$3,000.00				
	to \$6,400.00				
	NEW ACCOUNTING CODE ADDED:				
	Account code:				
	17-18-B-53G3-102A58-2505-1753GP7045-001				
	Beginning FiscalYear 17				
	Ending Fiscal Year 18				
	Fund (Appropriation) B				
	Budget Organization 53G3				
	Program (PRC) 102A58				
	Budget (BOC) 2505				
	Job # (Site/Project)				
	Cost Organization				
	DCN-LineID 1753GP7045-001				
	Quantity: 0				
	Amount: \$3,400.00				
	Percent: 0				
	Subject To Funding: N				
	Payment Address:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts Durham NC 27711				
	Durham NC 27711				
	Payment:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
	FOB: Destination				
	Period of Performance: 07/17/2017 to 07/08/2018				
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ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts									
Period	Previous Amount	This Action	Amount						
Base Period	\$3,000.00	\$3,400.00	\$6,400.00						
Total	\$3,000.00	\$3,400.00	\$6,400.00						

Total Task Order Ceiling								
Period	Previous Amount	This Action	Amount					
Base Period	±	\$6,400.00	\$6,400.00					
Total	•	\$6,400.00	\$6,400.00					

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDMENT OF SOLICITATION/MODIFIC	ATION OF CO	ONTRACT	1. CONTRACT ID CODE	PAGE	OF PAGES
2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE	DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJEC	∠ T NO. (If applicable)
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6. ISSUED BY CODE	HPOD		7. ADMINISTERED BY (If other than Item 6)	CODE	
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Washington DC 20460	0 900				
8. NAME AND ADDRESS OF CONTRACTOR (No., street AMEC ENVIRONMENT & INFRASTRUC Attn: LISA DWYER AMEC FOSTER WHEELER ENVIRONMENT 751 ARBOR WAY, STE 180 (b)(4) BLUE BELL PA 194221960	CTURE, II	NC.	9A. AMENDMENT OF SOLICITATION NO 9B. DATED (SEE ITEM 11) ** 10A. MODIFICATION OF CONTRACT/OR EP-W-16-015 1011 10B. DATED (SEE ITEM 13)		
CODE 038086125	FACILITY COD	DE DE	07/14/2017		
			MENDMENTS OF SOLICITATIONS		
Items 8 and 15, and returning conseparate letter or telegram which includes a reference THE PLACE DESIGNATED FOR THE RECEIPT OF Convirtue of this amendment you desire to change an offer reference to the solicitation and this amendment, and 12. ACCOUNTING AND APPROPRIATION DATA (If required)	e to the solicitatio OFFERS PRIOR er already submit is received prior	n and amendment numbe TO THE HOUR AND DAT ted , such change may be to the opening hour and c	E SPECIFIED MAY RESULT IN REJECTION made by telegram or letter, provided each tele	ENT TO BE RECEIVE OF YOUR OFFER I	ED AT If by
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			CHANGES SET FORTH IN ITEM 14 ARE MAD		
	CT/ORDER IS M H IN ITEM 14, PU	ODIFIED TO REFLECT T JRSUANT TO THE AUTH	HE ADMINISTRATIVE CHANGES (such as ch ORITY OF FAR 43.103(b).		
D. OTHER (Specify type of modification	and authority)				
X FAR 43.103(b) Unilat	eral				
E. IMPORTANT: Contractor X is not.	is required t	o sign this document and	return copies to the	issuing office.	
14. DESCRIPTION OF AMENDMENT/MODIFICATION DUNS Number: 038086125					
The purpose of this modifica All other terms and conditio TOCOR: MRURY02			e remaining funds in th	ne amount o	f \$138.73.
LIST OF CHANGES:					
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Incremental Funded Amount ch		from			
\$6,400.00 to \$6,261.27	J				
Continued					
Except as provided herein, all terms and conditions of the	ne document refe	renced in Item 9 A or 10A	, as heretofore changed, remains unchanged;	and in full force and a	effect.
15A. NAME AND TITLE OF SIGNER (Type or print)		3,131	16A. NAME AND TITLE OF CONTRACTING		
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED	Tomeka Hall 16B. UNITED STATES OF AMERICA 「知识」第二十八十十年(中)	FLECTRONIC SIGNATURL	16C. DATE SIGNED
(Signature of portion authorized to sign)			(Signature of Contracting Officer	4	05/14/2018

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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY		UNIT PRICE	AMOUNT
(A)	(B)	(C)	(D)	(E)	(F)
	Buyer changed				
	from Michael C. Fox				
	to Robert H. L. Powell				
	God and the Office of the ord				
	Contracting Officer changed				
	from Michael C. Fox				
	to Tomeka Hall				
	to Tomeka Hall				
	Type of Bridge Vehicle* (See Help Text for more				
	info) changed to : N				
	Purchase card use considered (See Help Text for				
	more info) changed to : YES: NOT ACCEPTED				
	Contract Office FITARA: Enter estimated dollar				
	value of ANY IT to be purchased under this award,				
	enter \$0 for no IT; upload IT approval in				
	contract file per EPAAG 39.1.1 (See help text for				
	more info) changed to : 0				
	CHANGES FOR LINE ITEM NUMBER: 1				
	Obligated Amount for this Modification: -\$138.73				
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	CHANGES FOR ACCOUNTING CODE:				
	17-18-B-53G3-102A58-2505-1753GP7045-001				
	Amount changed from \$3,400.00 to \$3,261.27				
	Percent changed from 53.125 to 0				
	Delivery: 07/08/2018				
	Delivery Location Code: OAR/OAQPS/CORE				
	OAR/OAQPS/CORE				
	US Environmental Protection Agency				
	Mail Code: C404-02				
	109 TW Alexander Drive Durham NC 27711 USA				
	Durham NC 27/11 USA				
	Payment:				
	RTP Finance Center				
	US Environmental Protection Agency				
	RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
	Period of Performance: 07/17/2017 to 07/08/2018				
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Prescribed by GSA - FAR (48 CFR) 63.212

19. ITEM NO.		20. SCHEDULE OF SUPPLIE:	S/SERVICES		21. QUANTITY	22. UNIT	23. UNIT PR	RICE	24. AMOUNT
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	Summary of	Amounts and Ceili	ngs and Attachmen	nt B					
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		g Officer's Repres	entative (COR) fo	or					
	this task		0000						
		chalski, (202) 343 Melissa@epa.gov	7-9002,						
	ruchaiski.	meiissagepa.gov							
	Alternate	COR:							
	Gregory Bea	achley, (202) 343-	9621,						
	Beachley.G	regory@epa.gov							
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NAME OF OFFEROR OR CONTRACTOR

EM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Accounting Info:				
	17-E1-53GS-102A04XPM-4183-1753PM7090-001 BFY: 17 Fund: E1 Budget Org: 53GS Program (PRC):				
	102A04XPM Budget (BOC): 4183 DCN - Line ID:				
	1753PM7090-001				
	Funding Flag: Partial Funded: \$40,000.00				
	runded: \$40,000.00				

ATTACHMENT A

STATEMENT OF WORK

Title: Characterization of Reduced Nitrogen at IMPROVE and CSN

Monitoring Sites

Contractor: Amec Foster Wheeler

Contract #: EP-W-16-015

Task Order #: 1012

Period of Performance: 7/9/2017 to 7/8/2018

EPA Key Personnel

Task Order Project Officer (TOPO)/Contract Level Project Officer (PO):

Melissa Puchalski Clean Air Markets Division (OAP/OAR/CAMD) 1200 Pennsylvania Ave., NW Mail Code 6204M

Washington, DC 20460 *phone:* (202) 343-9882

email: puchalski.melissa@epa.gov

Alternate TOPO:

Gregory Beachley Clean Air Markets Division (OAP/OAR/CAMD) 1200 Pennsylvania Ave., NW Mail Code 6204M Washington, DC 20460 phone: (202) 343-9621

email: Beachley.gregory@epa.gov

Contracting Officer (CO):

Michael Fox Contracting Officer Administrative Contract Service Center 1200 Pennsylvania Ave N.W. Mail Code 3803R

Washington DC 20460 phone: (202) 564-2550 email: fox.michael@epa.gov

STATEMENT OF WORK

I. INTRODUCTION

The Clean Air Status and Trends Network (CASTNET) is a long-term environmental monitoring network that measures changes in ambient air quality and assesses atmospheric deposition over broad geographic regions of the U.S. (https://www.epa.gov/castnet). Operating since 1987, CASTNET has evolved into a robust regional monitoring program which currently consists of approximately 95 monitoring stations nationwide. The Environmental Protection Agency (EPA) coordinates the operation of the network in cooperation with numerous federal, tribal, state and local partners.

The primary monitoring objectives of CASTNET are to:

- Provide high quality data on atmospheric deposition, rural ground level ozone and other forms of atmospheric pollution;
- Support the primary and secondary ozone National Ambient Air Quality Standards (NAAQS) and provide data on NAAQS compliance in rural areas;
- Monitor the status and trends in regional air quality and atmospheric deposition;
- Assess and report on geographic patterns and long-term, temporal trends in ambient air pollution and atmospheric deposition;
- Improve our understanding of Particulate Matter (PM) and ozone formation;
- Validate and improve atmospheric models;
- Provide data for health-based research and epidemiology studies;
- Assess the effectiveness of EPA's emission reduction programs; and
- Support science and ecosystem studies.

CASTNET sites measure weekly average concentrations of sulfate (SO₄²⁻), nitrate (NO₃⁻), ammonium (NH₄⁺), sulfur dioxide (SO₂), nitric acid (HNO₃), chloride (Cl⁻) and the base cations (Na⁺, K⁺, Mg²⁺and Ca²⁺) using a 3-stage filter pack. In addition, each site may make ancillary measurements, including hourly ozone (O₃), hourly meteorology, ammonia (NH₃) gas using passive devices, and trace-level gases. Trace-level gas monitors include reactive oxidized nitrogen (NOy), nitric oxide (NO), sulfur dioxide (SO₂) and carbon monoxide (CO). CASTNET O₃, meteorological, and trace gas measurements follow the requirements in the Code of Federal Regulations (CFR) and EPA's Quality Assurance Handbook.

II. Background

The Interagency Monitoring of Protected Visual Environments (IMPROVE) and Chemical Speciation (CSN) networks have provided two decades of routine particulate matter speciation data that support regional haze and PM NAAQS programs. The Clean Air Status and Trends Network (CASTNET) and National Atmospheric Deposition Program (NADP) have provide routine measurements of particulate, gaseous and wet deposition to support acid deposition programs. Over this period the chemical composition of the ambient atmosphere has changed markedly from one dominated by nitrate, sulfate and carbonaceous aerosols, and their associated precursor gases (NO_x, SO_x, VOCs, SVOCs), to an atmospheric mixture that includes a significant amount of reduced inorganic nitrogen – particulate ammonium (NH₄⁺) and its precursor gas, ammonia (NH₃). The magnitude of this change is reflected by a nationwide shift in the atmospheric nitrogen budget from one dominated by inorganic oxidized compounds, to one where reduced inorganic nitrogen species (NH_x = NH₃ + NH₄⁺) now have similar or greater concentrations. Total atmospheric nitrogen compounds are still primarily in inorganic forms, but have significant contributions from organically bound nitrogen (both reduced and oxidized

forms). Looking forward, the shift to larger relative contributions of atmospheric reduced inorganic nitrogen is projected to continue as existing rules and technologies continue to decrease NOx emissions from the transportation and energy generation sectors with an expected modest increase in NH₃ emissions. As the atmospheric emissions and composition evolve in response to rules, our networks must evolve to best inform decision makers to address such questions as:

- 1. What atmospheric species and emission sources contribute to PM, regional haze and nitrogen deposition?
- 2. What options in emissions reductions are available to reduce PM, regional haze and nitrogen deposition?

To answer these questions, it becomes necessary to characterize reduced nitrogen emission sources and atmospheric composition. Our networks are relatively well positioned to characterize inorganic oxides of nitrogen, but poorly positioned to characterize the increasingly dominant reduced component of atmospheric nitrogen. This severe limitation is affecting our ability to understand and mitigate the causes of excess PM, haze and nitrogen deposition, in which reduced nitrogen compounds are playing an increasingly important role.

III. PURPOSE

The primary purpose of this task order is to characterize reduced nitrogen ($NH_x = NH_3 + NH_4^+$) using existing network methodologies as a cost-effective, efficient way to characterize a significant contributor to PM formation, visibility degradation, and total nitrogen deposition. This study is a follow-on to the study performed by Chen et. al. (2014) in the western United States. This study will demonstrate if acid-impregnated filters within the IMPROVE module and the CSN Super Speciation Air Sampling System (SASS) can provide accurate NH_x concentrations in humid climates with low to moderate ambient NH_3 concentrations (Duke Forest, North Carolina and Gainesville, Florida) for approximately six months. The 1:3 sample schedule will be maintained for the CSN and IMPROVE samplers while a URG Annular Denuder System (ADS) will be used as a reference method on the same 1:3 day schedule at the two locations.

Objectives of the study:

- Test the NH_x monitoring method in hot and humid environments with low to moderate NH₃ concentrations.
- Assess sources of uncertainty in the measurement
- Develop standard sampling protocols that can be employed in a routine network.

IV. CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this task order are consistent with the activities authorized in CLIN 22 of the contract's Statement of Work.

V. TECHNICAL DIRECTION

1. Prepare a Technical Proposal & Cost Estimate

The Contractor shall prepare a Task Order Proposal in accordance with the terms and conditions of contract clauses B.2 entitled Fixed Rates for Services – Indefinite delivery/Indefinite quantity contract.

2. Operation and Calibration of the Measurement Systems

Under Task Order 12, the contractor installed a CSN Super SASS sampler, an IMPROVE PM2.5 system and a URG annular denuder system. Each system was calibrated prior to the start of the sampling period in May 2017.

The Contractor shall calibrate the flow system for the SASS, IMPROVE and URG sampling systems at the Gainesville facility once during the 6-month sampling period (i.e. after 3-months), and at the completion of the study (Task 5).

The contractor shall perform sample change outs according to the SOPs on the 1:3 day sample schedule provided in Task Order 12. The Duke Forest, NC site will follow the same sample schedule. Routine monthly leak checks shall be performed on each sampling system.

3. Preparing and Extracting Samples

The contractor shall prepare H₃PO₃-impregnated filters (37 mm cellulose and 47 mm cellulose) for the Duke Forest and Gainesville sites following the protocols described in Chen et. al. (2014). Following sample collection, the impregnated cellulose filters shall be extracted with deionized (DI) water according to the standard IMPROVE method at: http://vista.cira.colostate.edu/Improve/wp-content/uploads/2016/07/IMPROVE-Anion-Cation-Analysis-by-Ion-Chromatography-SOP-2016.pdf

The MgO denuders will be provided by EPA. The contractor shall coat the MgO honeycomb denuders following the SOP provided, but not extract them. The MgO denuder shall be cleaned and recoated after 3 months. The MgO denuder SOP can be found here:

https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIMgOHoneycombDenuderSOP.pdf

The contractor shall prepare 3 denuders for the ADS (one Na₂CO₃ and two H₃PO₃-coated denuders). The two (H₃PO₃)-coated denuders will be extracted. The contactor shall extract the URG ADS denuders and H₃PO₃-impregnated filters using the recommendations described in EPA's Compendium of Methods for Inorganic Air Pollutants IO-4.2 (https://www3.epa.gov/ttn/amtic/files/ambient/inorganic/mthd-4-2.pdf). The H₃PO₃ denuders shall be extracted with DI water. The Na₂CO₃-coated denuder shall be cleaned and recoated monthly.

The nylon filter from the CSN SuperSASS shall be extracted for particulate NH₄⁺ using the procedure described in the CSN SOP located here: https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25cationsop.pdf.

All extracts should be stored under refrigeration until the analysis is performed.

Laboratory and field blanks shall be prepared and analyzed routinely as described in Table 1 below.

4. Sample Analysis

The contractor shall analyze the cellulose filter extracts and denuder extracts from the Gainesville and Duke Forest sites by IC. The Duke Forest operator will ship the denuder and filter extracts to the contractor's facility.

The contractor shall analyze the extracts using the method described in the SOP for PM_{2.5} Cation Analysis found here: https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25cationsop.pdf. Laboratory analysis results shall be converted to concentrations using the total sample volume recorded in a database.

Laboratory analysis results shall be converted to concentrations using the total sample volume and recorded in the database.

Table 1

Network/Sampler	Channels	annels Schedule		Trip Blank	Field Blank	
			Blank			

	Channel 1: H ₃ PO ₃	1:3 day	Weekly	Monthly	Monthly
	filter (47 mm)	sampling			
CSN/SuperSASS	Channel 2: MgO	1:3 day	Weekly (filter	Monthly	Monthly (filter
SANCE.	denuder, 47 mm	sampling	only)	(filter only)	only)
	nylon filter				
IMPROVE	Channel B modified:	1:3 day	Weekly	Monthly	Monthly
Sampler	H ₃ PO ₃ filter (37 mm)	sampling	,	9.00	72
	H ₃ PO ₃ Acid denuder	1:3 day	Weekly	Monthly	Monthly
	(2)	sampling	595	**	,,004
URG	Nylon Filter (47 mm)	1:3 day	Weekly	Monthly	Monthly
		sampling			
	Na ₂ CO ₃ denuder		None	None	None

5. Calibrate and Uninstall Measurement Systems

After the 6-month sampling period the contractor shall perform a final calibration on the CSN Super SASS, IMPROVE PM2.5 sampler and the URG denuder system. The contractor shall uninstall the equipment at the Gainesville facility. The contractor shall return the borrowed equipment to OAQPS and/or Colorado State University.

VI. DELIVERABLES AND SCHEDULE

1. Proposal

The contractor shall deliver a Task Order Proposal in accordance with clause B.7 Task Order Ordering Procedures of the contract. The proposal shall be submitted 10 days after receipt of the SOW.

2. Monthly Progress Report

The contractor shall prepare and submit a monthly progress report by the 15th of each month summarizing the progress made, issues encountered or expected, work planned for the next reporting period and costs. These reports shall comply with contract clauses F.1 Monthly Progress Report. Reports and F-5 Reports of Work shall be delivered electronically.

3. Database

The contractor shall deliver a database submittal with valid data and all QA/QC data reported during the field campaign. Results from the previous 30-day period shall be submitted no later than 30 days after the last sample of the month was taken. The database shall be delivered on the last day of the month.

Distribution of Deliverables:

Addressee	Copies
EPA Contracting Officer (Mike Fox)	1
EPA Project Officer (Melissa Puchalski)	1
EPA Alternate (Gregory Beachley)	1
EPA Technical Advisor (John T Walker)	1
EPA Technical Advisor (Joann Rice)	1
EPA Technical Advisor (Rich Scheffe)	1

VII. References

Chen, X., Day, D., Schichtel, B., Malm, W., Matzoll, A.K., Mojica, J., McDade, C.E., Hardison, E.D., Hardison, D.L, Walters, S., Van De Water, M., and Collett Jr., J.L. (2014) Seasonal ambient ammonia and

ammonium concentrations in a pilot IMPROVE NHx monitoring network in the western United States. Atmos. Envir. 91, 118-126.

RTI International, Standard Operating Procedures for Determination of Anions and/or Cations Extracted from Nylon Filters by Ion Chromatography (IC), Rev. 5. Mar. 3, 2016 (http://vista.cira.colostate.edu/Improve/wp-content/uploads/2016/07/IMPROVE-Anion-Cation-Analysis-by-Ion-Chromatography-SOP-2016.pdf).

RTI International, Standard Operating Procedure for Coating and Extracting Denuders for Capture of Ammonia and Its Measurement, Rev. 0. Feb. 14, 2008 (https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIDenudersCaptureAmmFINAL.pdf).

RTI International, Standard Operating Procedures for Coating Aluminum Honeycomb Denuders with Magnesium Oxide, Rev. 4. Feb. 17, 2009 (https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIMgOHoneycombDenuderSOP.pdf).

RTI International, Standard Operating Procedure for PM_{2.5} Cation Analysis, Rev. 7. Aug. 25, 2009 (https://www3.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25cationsop.pdf.).

US EPA, Model SASSTM & SuperSASSTM PM_{2.5} Ambient Chemical Speciation Samplers: Field Operation Manual, Doc. #SASS-9800 Rev. G. Dec. 27, 2001 (https://www3.epa.gov/ttnamti1/files/spectraining/MetOneSASSFOM.pdf).

US EPA, Compendium Method IO-4.2: Determination of Reactive Acidic and Basic Gases and Strong Acidity of Atmospheric Fine Particles (< 2.5 um). Jun. 1999 (https://www3.epa.gov/ttn/amtic/files/ambient/inorganic/mthd-4-2.pdf).

ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts						
Period	Previous Amount	This Action	Amount			
Base Period	-	\$40,000.00	\$40,000.00			
Total	E	\$40,000.00	\$40,000.00			

Total Task Order Ceiling						
Period	Previous Amount	This Action	Amount			
Base Period	-	\$46,193.00	\$46,193.00			
Total	ı	\$46,193.00	\$46,193.00			

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDMENT OF SOLICITATION/MODIFICA	ATION OF CONTRACT		CONTRACT ID CODE	PAGE	PAGE OF PAGES			
2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REC	UISITION/PURCHASE REQ. NO.	5. PROJEC	Γ NO. (If applicable)			
P00001	See Block 16C	PR-C	AR-17-01680					
6. ISSUED BY CODE	HPOD	7. ADMINISTERED BY (If other than Item 6) CODE						
HPOD US Environmental Protection William Jefferson Clinton Bu 1200 Pennsylvania Avenue, N. Mail Code: 3803R	ilding							
Washington DC 20460	sounts State and 7/D Code)	lo _A	AMENDMENT OF COLICITATION NO					
8. NAME AND ADDRESS OF CONTRACTOR (No., street AMEC ENVIRONMENT & INFRASTRUC Attn: LISA DWYER AMEC FOSTER WHEELER ENVIRONMI 751 ARBOR WAY, STE 180 (b)(4) BLUE BELL PA 194221960	CTURE, INC.	98 × 10. × 11.	AMENDMENT OF SOLICITATION NO. DATED (SEE ITEM 11) A. MODIFICATION OF CONTRACT/ORDER NO. 12 B. DATED (SEE ITEM 13)	O.				
CODE 038086125	FACILITY CODE	 	6/29/2017					
	11. THIS ITEM ONLY APPLIES T	O AMENDN	IENTS OF SOLICITATIONS					
CHECK ONE A. THIS CHANGE ORDER IS ISSUED FORDER NO. IN ITEM 10A.	r already submitted , such change mais received prior to the opening hour a tired) DDIFICATION OF CONTRACTS/ORD PURSUANT TO: (Specify authority)	ny be made and date sp et Inc ERS. IT MO	by telegram or letter, provided each telegram o ecified.	or letter makes 5, 193.0 SCRIBED IN I	TEM 14.			
D. OTHER (Specify type of modification X FAR 52.232-22 Limita	and authority)	AUTHORI	TY OF:					
E. IMPORTANT: Contractor 🗵 is not.	is required to sign this document	and return	copies to the issuing	a office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION The purpose of this modifica \$6,193.00 this task order. The purpose of the purpose	tion is to obligate	e incr	emental funding in the	amount				
\$46,193.00. This order is no and Ceilings and Attachment				ary of	Amounts			
LIST OF CHANGES: Reason for Modification : Fu Obligated Amount for this Mo New Total Obligated Amount f Incremental Funded Amount ch Continued	dification: \$6,193. or this Award: \$46,		0					
Except as provided herein, all terms and conditions of the 15A. NAME AND TITLE OF SIGNER (Type or print)	e document referenced in Item 9 A or	16A.	retofore changed, remains unchanged and in for NAME AND TITLE OF CONTRACTING OFFICE that C. Fox					
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED		den es	L FCTRONIC S:GNATURE				
(Signature of person authorized to sign)			(Signature of Contracting Officer)					

 CONTINUATION SHEET
 REFERENCE NO. OF DOCUMENT BEING CONTINUED
 PAGE
 OF

 EP-W-16-015/1012/P00001
 2
 2

NAME OF OFFEROR OR CONTRACTOR

EM NO.	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	\$40,000.00 to \$46,193.00 CHANGES FOR LINE ITEM NUMBER: 1 Obligated Amount for this modification: \$6,193.00 Incremental Funded Amount changed from \$40,000.00 to \$46,193.00				
	NEW ACCOUNTING CODE ADDED: Account code: 17-E1-53GS-102A04XPM-4183-1753PM7130-001 Beginning FiscalYear 17 Ending Fiscal Year Fund (Appropriation) E1 Budget Organization 53GS Program (PRC) 102A04XPM Budget (BOC) 4183 Job # (Site/Project) Cost Organization DCN-LineID 1753PM7130-001 Amount: \$6,193.00 Subject To Funding: N Payment Address:				
	RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711				
	Payment: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 FOB: Destination				
	Period of Performance: 07/09/2017 to 07/08/2018				

ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts						
Period	Previous Amount	This Action	Amount			
Base Period	\$40,000.00	\$6,193.00	\$46,193.00			
Total	\$40,000.00	\$6,193.00	\$46,193.00			

Total Task Order Ceiling						
Period	Previous Amount	This Action	Amount			
Base Period	±	\$46,193.00	\$46,193.00			
Total	-	\$46,193.00	\$46,193.00			

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDMENT OF SOLICITATION/MODIFIC	ATION OF CO	ONTRACT	CONTRACT ID CODE	OF PAGES	
2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE	DATE	 4. REQUISITION/PURCHASE REQ. NO.	5. PROJEC	2 Γ NO. (If applicable)
P00002	See Bloo	ck 16C			
6. ISSUED BY CODE	HPOD		7. ADMINISTERED BY (If other than Item 6)	CODE	
HPOD US Environmental Protection William Jefferson Clinton Bu 1200 Pennsylvania Avenue, N. Mail Code: 3803R Washington DC 20460	ilding			_	
8. NAME AND ADDRESS OF CONTRACTOR (No., street	t, county, State and	ZIP Code)	x) 9A. AMENDMENT OF SOLICITATION N	O.	
AMEC ENVIRONMENT & INFRASTRU Attn: LISA DWYER AMEC FOSTER WHEELER ENVIRONM 751 ARBOR WAY, STE 180 (b)(4) BLUE BELL PA 194221960	CTURE, IN	NC.	9B. DATED (SEE ITEM 11) 10A. MODIFICATION OF CONTRACT/O EP-W-16-015 1012 10B. DATED (SEE ITEM 13)		
CODE 038086125	FACILITY COD	E	06/29/2017		
	11. THIS ITE	M ONLY APPLIES TO AM	 ENDMENTS OF SOLICITATIONS		
Offers must acknowledge receipt of this amendment planes 8 and 15, and returning coseparate letter or telegram which includes a reference THE PLACE DESIGNATED FOR THE RECEIPT OF virtue of this amendment you desire to change an offereference to the solicitation and this amendment, and 12. ACCOUNTING AND APPROPRIATION DATA (If required)	pies of the amend to the solicitation OFFERS PRIOR or already submitt is received prior	dment; (b) By acknowledgen and amendment number TO THE HOUR AND DATed, such change may be to the opening hour and d	ing receipt of this amendment on each copy rs. FAILURE OF YOUR ACKNOWLEDGEM E SPECIFIED MAY RESULT IN REJECTION made by telegram or letter, provided each te	of the offer submitted; MENT TO BE RECEIVE N OF YOUR OFFER. I	or (c) By ED AT f by
See Schedule			Decrease.	Ψ1 . 33	
13. THIS ITEM ONLY APPLIES TO M	ODIFICATION O	F CONTRACTS/ORDERS	IT MODIFIES THE CONTRACT/ORDER NO). AS DESCRIBED IN I	TEM 14.
CHECK ONE A. THIS CHANGE ORDER IS ISSUED I ORDER NO. IN ITEM 10A.	PURSUANT TO:	(Specify authority) THE (CHANGES SET FORTH IN ITEM 14 ARE MA	DE IN THE CONTRAC	ст
B. THE ABOVE NUMBERED CONTRAGE Appropriation date, etc.) SET FORTH			HE ADMINISTRATIVE CHANGES (such as a DRITY OF FAR 43.103(b). THORITY OF:	hanges in paying offic	е,
D. OTHER (Specify type of modification	***	-			
X FAR 52.232-22 Limita	ition of	Funds			
E. IMPORTANT: Contractor is not.	9.		return copies to the		
14. DESCRIPTION OF AMENDMENT/MODIFICATION DUNS Number: 038086125	(Organized by U	CF section headings, incl	iding solicitation/contract subject matter whe	re feasible.)	
The purpose of this modifica	tion is t	to de-obligat	e funding in the amoun	it of \$1.59	from this
task order.		,			
TOCOR: Melissa Puchalski					
LIST OF CHANGES:					
Reason for Modification: Fun	ding Only	y Action			
Obligated Amount for this Mo	dificatio	on: -\$1.59			
New Total Obligated Amount f	or this A	Award: \$46,19	1.41		
Incremental Funded Amount ch	anged:	from			
\$46,193.00 to \$46,191.41					
CHANGES FOR LINE ITEM NUMBER	: 1				
Continued					
Except as provided herein, all terms and conditions of the	ne document refe	renced in Item 9 A or 10A	, as heretofore changed, remains unchanged	d and in full force and e	effect.
15A. NAME AND TITLE OF SIGNER (Type or print)			16A. NAME AND TITLE OF CONTRACTIN	IG OFFICER (Type or	print)
			Michael C. Fox		
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	EL FOTRONIC	16C. DATE SIGNED
(Signature of person authorized to sign)			(Signature of Contracting Office	5:GNATURE	

 CONTINUATION SHEET
 REFERENCE NO. OF DOCUMENT BEING CONTINUED EP-W-16-015/1012/P00002
 PAGE EP-W-16-015/1012/P00002
 PAGE 2
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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY UN	IIT UNIT PRICE	AMOUNT
(A)	(B)	(C) (I		(F)
	Obligated Amount for this Modification: -\$1.59			
	Incremental Funded Amount changed from \$46,193.00			
	to \$46,191.41			
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	CHANGES FOR ACCOUNTING CODE:			
	17-E1-53GS-102A04XPM-4183-1753PM7090-001			
	Amount changed from \$40,000.00 to \$39,998.41			
	Payment:			
	RTP Finance Center			
	US Environmental Protection Agency			
	RTP-Finance Center (AA216-01)			
	109 TW Alexander Drive			
	www2.epa.gov/financial/contracts			
	Durham NC 27711 Period of Performance: 07/09/2017 to 07/08/2018			
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2. CONTRACT N EP-W-16	IO.	3	AWARDI PFECTIVE DATE	4. ORDER NUMBER			b.	SOCICITATION NUMBER			OLIGITATION UE DATE
	R SOLICITATION PRMATION CALL:	Michael I	Fox	<u> </u>		TELEPHONE 202-564		(Na collect cells)	8. OFFER ET	DUE DATEA OF	CALTIME
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176. CONTRACT OFFEROR		038086125	FACILITY CODE		16a PAYMENT	CAM BR LLIW	EBY		CODE	RTP FMC	
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DUNS Number: 038086125 This task order is issued in accordance with Task Order Ordering Procedures and hereby incorporates the base contract terms and conditions by reference. The effective date for performance to commence is January 10, 2018. The Contractor shall perform in accordance with the Attachment A Statement of Work (4 pages) and the accepted technical proposal and cost estimate dated January 3, 2018 (6 pages) in the amount of (Use Reverse and/or Attach Additional Sheets as Necessary)											
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☐ 27b, CONTE	RACT/PURCHASE OF	RDER INCORPORATES E	Y REFERENCE	FAR 52,212-4, FAR 52	212-5 IS ATTA	CHED.	ADDENDA		L ARE		TATTACHED.
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AUTHORIZED FOR LOCAL REPRODUCTION PREVIOUS EDITION IS NOT USABLE

STANDARD FORM 1448 (REV. 2/2012) Prescribed by GSA - FAR (48 CFR) 63.212

19. ITEM NO.		20. SCHEDULE OF SUPPLIES	S/SERVICES	S		21. QUANTITY	22. UNIT	23. UNIT PR	RICE	24. AMOUNT
	\$51,663.00.									
			(5.2)	0 1 - 1 - 1 - 1 - 1 - 1						
	This is a Time-and-Materials (T&M) task order with a total ceiling price of \$51,663.00, which									
		at celling price of ctor is not author								
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	Concractor	caccods at 1t3 ow	11 113	Λ.						
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of Amounts and Ceilings and Attachment B is										
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	Contracting	g Officer's Repres	ent at	ive (COR) fo)r					
	this task		circuc	100 (0010) 10	, <u> </u>					
	ESSENSION NO. 19 DESCRIPTION OF THE PERSON O	s, (919)541-2262,								
		zabeth@epa.gov								
	Alternate (COR:								
	Joann Rice,	, (919)541-3372, R	ice.J	oann@epa.gov	7					
	The service	es of this order a	re fo	r severable.						
	TOCOR: Betl	h Landis								
Period of Performance: 01/10/2018 to 07/08/2021			21							
0001	Pre-washing	g CSN Nylon Filter	S							51,663.00
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32b. SIGNATUI	RE OF AUTHORIZED	GOVERNMENT REPRESENTATIV	E	32c. DATE	32d. PRIN	NTED NAME	AND 1	TITLE OF AUTH	ORIZED G	OVERNMENT REPRESENTATIVE
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41a. I CERTIFY	THIS ACCOUNT IS C	L CORRECT AND PROPER FOR PAY	MENT		42a. R	ECEIVED BY	(Prin	t)		
41b. SIGNATUI	RE AND TITLE OF CE	RTIFYING OFFICER	4	1c. DATE	42b. R	42b. RECEIVED AT (Location)				
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	EP-W-16-015/1013	3	3

NAME OF OFFEROR OR CONTRACTOR

EM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Fund: E1 Budget Org: 53GS Program (PRC):				
	102A04XPM Budget (BOC): 4183 DCN - Line ID: 1853PM8016-001				
	Funding Flag: Partial				
	Funded: \$51,663.00				

ATTACHMENT A

Statement of Work

Title: Pre-washing CSN Nylon Filters

Contractor: Amec Foster Wheeler

Contract #: EP-W-16-015

Task Order #: 1013

Period of Performance: 01/10/2018 to 7/08/2018

EPA Key Personnel

Task Order Project Officer (TOPO)/Contract Level Project Officer (PO):

Beth Landis

Air Quality Assessment Division (OAR/OAQPS/AQAD)

Mail Drop C304-06

Research Triangle Park, NC 27711

phone: (919) 541-2262

email: landis.elizabeth@epa.gov

Alternate TOPO:

Joann Rice

Air Quality Assessment Division (OAR/OAQPS/AQAD)

Mail Drop C304-06

Research Triangle Park, NC 27711

Phone: (919) 541-3372 Email: rice.joann@epa.gov

Contracting Officer (CO):

Mike Fox

Contracting Officer

Administrative Contract Service Center

1200 Pennsylvania Ave N.W.

Mail Code 3803R

Washington DC 20460

phone: (202) 564-2550

email: fox.michael@epa.gov

STATEMENT OF WORK

I. INTRODUCTION

The Clean Air Status and Trends Network (CASTNET) is a long-term environmental monitoring network that measures changes in ambient air quality and assesses atmospheric deposition over broad geographic regions of the U.S. (https://www.epa.gov/castnet). Operating since 1987, CASTNET has evolved into a robust regional monitoring program which currently consists of approximately 95 monitoring stations nationwide. The Environmental Protection Agency (EPA) coordinates the operation of the network in cooperation with numerous federal, tribal, state and local partners.

The primary monitoring objectives of CASTNET are to:

- Provide high quality data on atmospheric deposition, rural ground level ozone and other forms of atmospheric pollution;
- Support the primary and secondary ozone NAAQS and provide data on NAAQS compliance in rural
 areas;
- Monitor the status and trends in regional air quality and atmospheric deposition;
- Assess and report on geographic patterns and long-term, temporal trends in ambient air pollution and atmospheric deposition;
- Improve our understanding of PM and ozone formation;
- Validate and improve atmospheric models;
- Provide data for health-based research and epidemiology studies;
- Assess the effectiveness of EPA's emission reduction programs; and
- Support science and ecosystem studies.

CASTNET sites measure weekly average concentrations of sulfate (SO₄²⁻), nitrate (NO₃⁻), ammonium (NH₄⁺), sulfur dioxide (SO₂), nitric acid (HNO₃), chloride (Cl⁻) and the base cations (Na⁺, K⁺, Mg²⁺and Ca²⁺) using a 3-stage filter pack. In addition, each site may make ancillary measurements, including hourly ozone (O₃), hourly meteorology, ammonia (NH₃) gas using passive devices, and trace-level gases. Trace-level gas monitors include reactive oxidized nitrogen (NOy), nitric oxide (NO), sulfur dioxide (SO₂) and carbon monoxide (CO). CASTNET O₃, meteorological, and trace gas measurements follow the requirements in the Code of Federal Regulations (CFR) and EPA's Quality Assurance Handbook.

II. PURPOSE

The primary purpose of this task order is to pre-wash nylon filters for the Chemical Speciation Network (CSN) and conduct acceptance testing. Once the filters have been washed and pass the CSN acceptance testing criteria, they will be shipped to Wood PLC (formerly Amec Foster Wheeler) for use in the routine network, which functions under a contract between Wood PLC and EPA's OAQPS. The Task Order Project Officer shall provide technical direction for performance of specific tasks under this task order.

III. CONTRACT LEVEL STATEMENT OF WORK REFERENCE

The tasks to be performed under this task order are consistent with the activities authorized in CLIN 22 of the contract's Statement of Work.

IV. TECHNICAL DIRECTION

1. Prepare a Technical Proposal & Cost Estimate

The Contractor shall prepare a Task Order Proposal in accordance with the terms and conditions of contract clauses B.2 entitled Fixed Rates for Services – Indefinite delivery/Indefinite quantity contract.

2. Pre-wash and acceptance test the Chemical Special Network (CSN) Nylon Filters

The Contractor shall prewash and acceptance test nylon filters for the Chemical Speciation Network. Wood PLC (formerly Amec Foster Wheeler) shall provide the filters for washing and acceptance testing (procured under the CSN contract). The contractor shall follow the SOP for Cleaning Nylon Filters Used for the Collection of PM2.5 Material

(https://www3.epa.gov/ttnamti1/files/ambient/pm25/spec/pm25nyloncleaningsop.pdf) for cleaning and the Standard Operating Procedure for Procurement and Acceptance Testing of Teflon, Nylon, and Quartz Filters (https://www3.epa.gov/ttnamti1/files/ambient/pm25/spec/RTIFilterProcurementSOPFINAL.pdf) for acceptance testing. The cleaned filters must meet EPA's acceptance testing criteria for the CSN, of an average for each cleaning batch that is ≤ 1 ug/filter for each ion (chloride, ammonium, sodium, potassium, nitrate and sulfate). Acceptance testing shall occur on 5% of the filters per batch that is cleaned, likely to occur on a weekly basis. We anticipate up to 300 filters will be cleaned on a weekly basis, and acceptance testing results shall be submitted to OAQPS within 7 days of completion of the pre-cleaning and drying. Data shall be summarized and delivered to the CORs in an agreed upon format. The contractor shall provide cleaned filters and acceptance testing results to Wood PLC on a weekly basis for deployment in network. The CSN uses up to 1500 nylon filters per month, and currently has 7000 contaminated MTL filters. Should the CSN switch to a different filter manufacturer that does not require pre-washing, the TOPO shall inform the contractor that there is no longer a need for these services. The maximum number of filters to be pre-washed and acceptance tested under this task is 7000.

3. Pre-wash and Acceptance Test Additional CSN Nylon Filters

Wood PLC has order an additional 4500 nylon filters from a different manufacturer that the network plans to switch to, as long as they meet the acceptance testing criteria outlined in Task 2. Should these filters also be contaminated, the TOPO shall inform the contractor of the need to exercise Task 3 and pre-wash and acceptance test up to 4500 additional filters. The contractor shall follow the same requirements laid out in Task 2. This task shall not begin unless authorized by the TOPO.

4. Travel to Meetings

None anticipated.

V. DELIVERABLES AND SCHEDULE

1. Proposal

The contractor shall deliver a Task Order Proposal in accordance with clause B.7 Task Order Ordering Procedures of the contract. The proposal shall be submitted 10 days after receipt of the SOW.

2. Monthly Progress Report

The contractor shall prepare and submit a monthly progress report by the 15th of each month summarizing the progress made, issues encountered or expected, work planned for the next reporting period and costs. These

reports shall comply with contract clauses F.3 Reports of Work and F.5 Monthly Progress Report. Reports shall be delivered electronically.

Distribution of Deliverables:

Addressee	Copies
EPA Contracting Officer (Mike Fox)	1
EPA Project Officer (Melissa Puchalski)	1
EPA TOPO (Beth Landis)	1
EPA Alternate (Joann Rice)	1
EPA Technical Advisor (Taylor Macy)	1

ATTACHMENT B SUMMARY OF TASK ORDER OBLIGATION/CEILING AMOUNTS

Total Funding/Obligation Amounts							
Period	Previous Amount	This Action	Amount				
Base Period	-	\$51,663.00	\$51,663.00				
Total	:-	\$51,663.00	\$51,663.00				

	Total Task Order Ceiling						
Period	Previous Amount	This Action	Amount				
Base Period	-	\$51,663.00	\$51,663.00				
Total	-	\$51,663.00	\$51,663.00				

Note: This task order is incrementally funded in accordance with contract clause B.5 Limitation of Government's Obligation (EPA-B-32-103).

AMENDMENT OF SOLICITATION/MODIFIC	ATION OF CO	ONTRACT	1. CONTRACT ID CODE	PAGE	OF PAGES
2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE	DATE	I. REQUISITION/PURCHASE REQ. NO.	5. PROJEC1	2 [NO. (If applicable)
P00001	See Bloo	ck 16C			
6. ISSUED BY CODE	HPOD		7. ADMINISTERED BY (If other than Item 6)	CODE	
HPOD US Environmental Protection William Jefferson Clinton Bu 1200 Pennsylvania Avenue, N. Mail Code: 3803R Washington DC 20460	ilding			_	
8. NAME AND ADDRESS OF CONTRACTOR (No., street	, county, State and	ZIP Code)	9A. AMENDMENT OF SOLICITATION N	O.	
AMEC ENVIRONMENT & INFRASTRU Attn: LISA DWYER AMEC FOSTER WHEELER ENVIRONM 751 ARBOR WAY, STE 180 ((b)(4) BLUE BELL PA 194221960		NC.	9B. DATED (SEE ITEM 11) 10A. MODIFICATION OF CONTRACT/O EP-W-16-015 1013 10B. DATED (SEE ITEM 13)	RDER NO.	
CODE 038086125	FACILITY COD	DE	01/10/2018		
	11. THIS ITE	 EM ONLY APPLIES TO AM	 ENDMENTS OF SOLICITATIONS		
Offers must acknowledge receipt of this amendment platems 8 and 15, and returning co separate letter or telegram which includes a reference THE PLACE DESIGNATED FOR THE RECEIPT OF virtue of this amendment you desire to change an offereference to the solicitation and this amendment, and 12. ACCOUNTING AND APPROPRIATION DATA (If req	pies of the amend to the solicitation OFFERS PRIOR or already submitt is received prior	dment; (b) By acknowledg n and amendment numbe TO THE HOUR AND DAT ted , such change may be to the opening hour and d	ing receipt of this amendment on each copy rs. FAILURE OF YOUR ACKNOWLEDGEM E SPECIFIED MAY RESULT IN REJECTION made by telegram or letter, provided each te	of the offer submitted; MENT TO BE RECEIVE N OF YOUR OFFER. II	or (c) By D AT f by
See Schedule					
13. THIS ITEM ONLY APPLIES TO M	ODIFICATION O	F CONTRACTS/ORDERS	IT MODIFIES THE CONTRACT/ORDER NO). AS DESCRIBED IN I	TEM 14.
			CHANGES SET FORTH IN ITEM 14 ARE MA		
appropriation date, etc.) SET FORTH C. THIS SUPPLEMENTAL AGREEMEN			HE ADMINISTRATIVE CHANGES (such as a DRITY OF FAR 43.103(b). THORITY OF:	mangee in paying one.	
D. OTHER (Constitutions of modification					
D. OTHER (Specify type of modification X FAR 52.232-22 Limita	•	Funds			
	- <u>100-100</u>		coturn conice to the	ho issuing office	
E. IMPORTANT: Contractor is not. 14. DESCRIPTION OF AMENDMENT/MODIFICATION DUNS Number: 038086125	(Organized by U		ding solicitation/contract subject matter whe	ere feasible.)	
The purpose of this modifica this task order. TOCOR: Beth Landis LIST OF CHANGES: Reason for Modification: Fun Obligated Amount for this Mo New Total Obligated Amount f	ding Only	y Action on: -\$12,578.	64	t of \$12,57.	8.64 from
CHANGES FOR LINE ITEM NUMBER Obligated Amount for this Mo Continued Except as provided herein, all terms and conditions of the	dificatio			d and in full force and c	.ffact
15A. NAME AND TITLE OF SIGNER (Type or print)	document rele	STOCK IN ROLL OF A OF TOA	16A. NAME AND TITLE OF CONTRACTIN		
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	EL FOTRONIC S:GNATURE	16C. DATE SIGNED
(Signature of person authorized to sign)			(Signature of Contracting Office	er)	1

 CONTINUATION SHEET
 REFERENCE NO. OF DOCUMENT BEING CONTINUED
 PAGE
 OF

 EP-W-16-015/1013/P00001
 2
 2

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Incremental Funded Amount changed from \$0.00 to				
	\$39,084.36 FOB changed from Destination to				
	CHANGES FOR ACCOUNTING CODE: 17-E1-53GS-102A04XPM-4183-1853PM8016-001				
	Amount changed from \$51,663.00 to \$39,084.36				
	Payment:				
	RTP Finance Center				
	US Environmental Protection Agency RTP-Finance Center (AA216-01)				
	109 TW Alexander Drive				
	www2.epa.gov/financial/contracts				
	Durham NC 27711				
	Period of Performance: 01/10/2018 to 07/08/2021				